

UNITED STATES MARINE CORPS
Logistics Operations School
Marine Corps Combat Service Support School
PSC Box 20041
Camp Lejeune, North Carolina 28542-0041

LS 402

STUDENT OUTLINE

MARK HELICOPTER LANDING ZONE

LEARNING OBJECTIVES

1. Terminal Learning Objective: Given a designated helicopter landing zone, marker panels, wind direction indicators, marking lights, and to ensure safe movement of helicopters within the landing zone, mark a helicopter landing zone per the references. (0481.01.05)
2. Enabling Learning Objectives: Without the aid of references, explain landing zone, site, and point designation per the references. (0481.01.05a)
 - a. List landing site selection and landing point requirements. (0481.01.05b)
 - b. Describe the installation of wind direction indicators and analyze location of wind direction indicators within the landing zone. (0481.01.05c)
 - c. Provided a designated landing zone, tools, and marking panels, as the member of a team, install marking panels per the references. (0481.01.05d)
 - d. Describe and install nighttime marking lights. (0481.01.05e)

OUTLINE

1. **LANDING ZONE (LZ) REQUIREMENTS.**

- a. Landing Zone (LZ) Designation.

(1) Landing Zone (LZ). A landing zone is a specified ground area used for landing a helicopter borne force and its

supplies. Landing zones are designated by code names such as birds, animals, or trees like "LARK" or BLUEBIRD".

b. Landing Site Designation.

REFER TO THE STUDENT HANDOUT FOR PICTURES

(1) Landing Site. A landing site is a specified ground area in the landing zone where helicopters can land and are designated by color such as green, blue, or red. The number of landing sites required for an operation depends upon the mission, terrain, number of aircraft, and the amount of equipment to be lifted.

c. Landing Point Designation.

(1) Landing Point. A landing point is a specified ground area in the landing site where one helicopter lands, picks up, or drops off a load. A two-digit number is used to designate landing points. Landing points are usually used for placement of artillery or supply positioning.

2. LANDING SITE AND LANDING POINT SELECTION.

a. Landing Sites. Considerations during selection of the landing sites.

(1) Helicopter landing sites are selected to best support the ground force. The troop unit commander will select the landing site and the landing points within the LZ based on the advice of the helicopter unit commander.

(2) Shield landing sites and flight approaches from enemy observation by masking terrain or wooded areas. If it is impossible to conceal helicopter activity with natural terrain features, it may be necessary to lay smoke between the site and possible enemy positions during the time the site is in use.

(3) Locate landing sites as much as possible in areas that reduce the risk of being found and moved upon. Landing sites that are used primarily for supply or resupply should be located near a storage or dump area to reduce the ground movement of cargo after it is delivered.

(4) The size of the landing site depends upon the number of landing points within it, the size of the landing points, the

obstructions near or around the landing site, and the tactical dispersion required between the landing points.

(5) It is not desirable to establish landing sites that require the helicopter to take off or land vertically without any forward flight. Helicopters require greater power to ascend or descend vertically, thereby reducing their allowable payload. The helicopter will require less power if it can depart with some forward airspeed.

(6) Helicopters can take off and hover with less power when they are *headed into the wind*. For every meter of a vertical obstacle, you must have 10 meters from the center of a landing point to the obstacle. For nighttime the helicopter requires 14 meters from center of a landing point to an obstacle, not to exceed 6 degrees in day and 4 degrees at night over obstacle for an approach angle.

(7) Avoid dry barren areas because the dust clouds blind the pilot and helicopter support team (HST) personnel in the vicinity. Dust particles drawn into the air intake can damage the helicopter's engines.

b. Landing Point requirements. Considerations during selection of the landing points.

REFER TO THE STUDENT HANDOUT FOR PICTURES

(1) Landing points should be as level as possible. Where a slope is present, it should be uniform. During daylight approaches, the slope should not exceed 7 degrees and at night down slope as viewed from the approach path is not normally acceptable. Forward and/or lateral slopes should not exceed 3 degrees.

(2) Landing points should also be firm enough to keep a fully loaded aircraft's landing gear from sinking into the ground. If the ground can support the weight of a 5-ton truck, then the helicopter can land without the risk of sinking.

(3) Minimum distance between landing points within a landing site is measured from the center of one landing point to the center of another. The size of the points is determined by the size of the helicopters using the site. Refer to landing point characteristics picture in handout.

3. WIND DIRECTION INDICATORS AND DAYTIME MARKING PANELS.

a. Wind direction indicators.

(1) Wind Indicators determine the wind direction so the pilot can determine the best direction to approach the landing site. The different types of wind indicators are:

(a) Wind "T". Construct the wind T out of two colored panels (beach flank markers) with the top or horizontal portion of the T into the wind. When installing a wind T the panels must be securely fastened to prevent the helicopter rotor wash from tearing them from the ground. The color of the panels **MUST** correspond with the color name of the Landing Site.

(b) Colored smoke. Use the color smoke stated in the operation order. In small landing zones, mark zone on-call with smoke so the pilot can identify the LZ and wind direction. (Only use red in emergency situations). If smoke is used, *only release after pilot has requested smoke*. Ensure that the canister is far enough away from the landing point so the rotor wash does not pick up the smoke and obstruct the aircrew's vision. May be used to identify landing points if needed.

(c) Wind sock. Usually seen at major commercial airports, naval air stations, and small airfields. If used during HST operations, position the windsock securely in the center of the landing site.

b. Daytime marking panels.

(1) When marking the landing points using marking panels, the colors must correspond with the colors of the wind T.

(2) The colored panels will be secured in the center of the landing point forming a cross pattern. As with the wind T, the LP marking panels must be securely fastened to the ground. All panels will be secured to the ground using tent pins.

(3) Smoke can also be used to mark the landing site and point for day operations as long as it does not disclose your position to the enemy.

4. NIGHTTIME MARKING LIGHTS.

a. General information.

(1) Helicopter-borne operations may be conducted into the night. However, the necessity for positive control, visual identification, and caution on the part of both the pilot and ground crew complicates such operations. For safety, it will be necessary to utilize smaller helicopter waves, with greater time intervals between waves, since the time required for loading, rendezvous, approach to landing zones, landing, and unloading will be increased. In the timing of the operations, consideration must be given to utilization of periods of sufficient visibility for the initial approach and landing. Once the landing zone is secured, navigational aids can be installed to facilitate continued operations. Regardless of the means employed, the following applies:

(a) Landing zone lighting should be visible to the pilot.

(b) Identify an area free of obstacles and safe for hovering and landing.

(c) Employ three or more lights at least 15 feet apart to prevent auto kinetic illusions.

b. Nighttime light patterns.

(1) Landing Sites and Landing Points that are used during night operations are carefully marked because the terrain features used during daytime operations are obscured. The methods used are the light "T", inverted "Y" light, and crow's foot light patterns. The light patterns are used to assist the pilot in locating, landing, and maneuvering within the site and point. Keep in mind that the following things hinder the pilots in maneuvering.

(a) Bright lights, especially intense or high beams will temporarily blind the pilot. Only use dim lights in the vicinity of the landing site.

(b) Chemlights, wands, or flashlights can be used to mark landing sites and points.

(c) Night vision goggles (NVG) compatible (blue, red) lighting must be used when the aircrew is using NVG.

c. Inverted Y light formation.

Refer to student handout for pictures.

(1) Four (4) lights used.

(2) Two (2) base lights spaced at a minimum of 7 meters apart.

(3) Two (2) stem lights spaced at a min. 14m from base and 14m between each other.

(4) A single helicopter will touch down or hover between the two (2) stem lights where the cargo is positioned.

d. T light formation.

Refer to student handout for pictures.

(1) Five (5) lights used.

(2) Three (3) base lights at a min. 10m apart.

(3) Two (2) stem lights at a min. 10m apart.

(4) The cargo is positioned 5m to the left of the base midway between the base and stem lights.

e. Crow's foot system.

Refer to student handout for pictures.

(1) Sixteen (16) lights used.

(2) Four (4) base lights.

(3) Twelve (12) foot lights.

(4) Fifteen (15) meters between all lights.

REFERENCES:

1. MCRP 4-11.3E Volume I. Multiservice Helicopter Sling Load: Basic Operations and Equipment.

2. MCRP 4-11.3E Volume II. Multiservice Helicopter Sling Load: Single-Point Load Rigging Procedures.

3. MCRP 4-11.3E Volume III. Multiservice Helicopter Sling Load: Dual-Point Load Rigging Procedures.